Universidade de Lisboa
Faculdade de Farmácia

Portraying prescribed drugs misuse amongst Portuguese young adults

A public health issue?

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Mestrado Integrado em Ciências Farmacêuticas

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Monografia de Mestrado Integrado em Ciências Farmacêuticas apresentada à Universidade de Lisboa através da Faculdade de Farmácia

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Resumo

A crescente popularidade e utilização de suplementos e substâncias estimuladoras como a Ritalina, Adderall, Modafinil, para aumento da performance intelectual no seio do Ensino Superior, despoletou o interesse de realizar um estudo empírico do comportamento relacionado com o consumo destas. Foi então com o objetivo de examinar o consumo e uso indevido de medicamentos prescritos para melhorar o desempenho psicológico e físico entre estudantes universitários em Portugal, que os autores realizaram um questionário online nacional onde foram entrevistados 756 alunos (com idades compreendidas entre os 18-30 anos). Ao realizar a comparação entre estudantes da Universidade de Lisboa *versus* estudantes não pertencentes à Universidade Lisboa, foi possível elaborar uma série de estudos com significância estatística compreendida num intervalo de confiança de 95% e margem de erro de 5%. Nestes foram avaliadas quais as principais substâncias consumidas, motivações, canais de aquisição, frequência de consumo correlacionando com vários fatores como o *background* académico dos estudantes, *income* financeiro e demografia em termos de Universidade.

Esta pesquisa foi a primeira do seu tipo, capaz de analisar as taxas de prevalência do uso não médico de estimulantes de prescrição assim como os fatores que moderam o mesmo. Como problema de saúde pública, a maior preocupação com este uso indevido é a segurança dos consumidores. Este tipo de substância tem influência ao nível cognitivo afetando o órgão humano mais complexo e importante - o nosso cérebro. E o risco do desenvolvimento de efeitos colaterais não intencionais é, portanto, tanto alto como consequente.

No geral, as descobertas do presente estudo sugerem que existe uma percentagem significativa de estudantes a consumir suplementos e multivitamínicos, mas também uma percentagem que recorre a fármacos para melhorar a sua concentração, atenção e capacidade de obter melhores resultados académicos - ainda que mais residual. Concluiu-se também que existe evidência de diferenças no consumo de acordo com o *background* académico.
Como exemplo, os estudantes de saúde tendem a consumir mais suplementos e medicamentos prescritos quando comparados com estudantes de Humanidades em geral ou de Ciências exatas. No entanto, não houve evidência de uma diferença estatisticamente significativa no consumo deste tipo de substâncias estimulantes quando comparado entre estudantes da Universidade de Lisboa e os restantes estudantes do país. Foi também verificado que a via online é um dos principais canais de aquisição. Por fim, é de salientar a confiança por parte dos estudantes relativamente ao farmacêutico e ao seu aconselhamento, quanto ao tipo e forma de consumo deste tipo de substâncias – sejam elas prescritas ou não.

Após este trabalho de pesquisa concluímos que, ainda assim, o consumo deste tipo de substâncias junto dos estudantes portugueses encontra-se dentro da média global (através do cruzamento com outros estudos homólogos). No entanto, não deixa de ser mais um fator de saúde pública que deve ser tido em conta não só pelos profissionais de saúde, mas também pela comunidade estudantil. Mais trabalhos devem ser feitos no sentido de educar os estudantes sobre o uso e abuso de "drogas inteligentes". Se a tendência persistir, é recomendado que as universidades estudem a possibilidade de criar um sistema de monitorização autónomo de forma a garantir a integridade da saúde dos seus alunos.

Palavras-chave: Psicofármacos; Estimulantes no Ensino Superior; Estudo Saúde Pública

Abstract

To examine the consumption and misuse of prescribed drugs to enhance psychological and physical performance among college students in Portugal, this national study was conducted with an online survey to 756 students (aged between 18-30 years old). By comparing students from University of Lisbon versus Non-University of Lisbon, this research was the first of its kind to audit the prevalence rates and moderators of non-medical use of prescribed stimulants (Ritalin, Dexedrine or Adderall) among Portuguese college students. As a public health issue, one of the biggest worries about this misuse is the consumers safety. It is well known that cognitive stimulants affect our brain and may have health risks and unwanted side effects.

Overall, the findings of the present study suggest that there was evidence of a statistically significant relation between consumption and the student's field of study. Health students tend to consume more supplements and prescribed drugs when compared with Humanities in general or Exact Sciences. Nevertheless, there was no evidence of a statistically significant consumption difference between University of Lisbon or non-University of Lisbon.

Further research should be done on the the best ways to educate students about smart drugs. If the trend continues, universities may need to think about creating a drug monetization system to ensure students' health and examination process.

Key-words: Prescription Drug Abuse; Research in higher education; Stimulant substances

To my parents Nuno and Céu, girlfriend Diana Oliveira my estimated and great professor Afonso Cavaco and all my friends that helped me with all the complex analysis.

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1. Introduction

Over the last years the rapid growth and interest about the World Wide Web, social networks and mobile technologies have changed the way citizens, and particularly young adults, search and get health information (Wartella, 2016). By enhancing the influence over each other's health, this sense of community is a big factor for the dissemination of knowledge about drugs and overall substances (Wong, 2014).
Besides increased social stimuli, it is well known that most citizens live in stressful times, each individual dealing with bigger workloads and demanding objectives. This prone people to find help and added advantages on handy solutions, such as drugs and xenobiotics intake. It is expected in young adults an augmented demand for such substances, with consumption amongst students that could increase with higher availability at both universities and online (Anderson, 2012). Reports indicate an increasing number of students struggling with work/life and productivity balance (Balsa et al., 2014). In most Western countries, researching and measuring the actual use and misuse of prescribed drugs for intellectual and physical enhancement amongst young adults is on the political agenda (Balsa et al., 2014).

1.1 Smart Drugs

Smart drugs, also known as cognitive enhancers, are a group of prescription drugs used to improve concentration, memory, focus and mental stamina during demanding periods. Both research and media has showed that this search for *neuroenhancement* is on the rise (Partridge, 2011). The most commonly used ones are Modafinil, Ritalin® and Adderall (Sahakian, 2007). These prescription drugs are normally used to treat mental disorders, such as attention deficit hyperactivity disorder, sleep disorders and Alzheimer's disease (Kolar, 2008). For instance, Modafinil, approved for the treatment of fatigue caused by narcolepsy, sleep apnea, is frequently used for enhancement of executive function by rested healthy persons (Schwartz, 2008). Taking these drugs may not have harmful effects in the short term, but in the long term the health risks are still unclear (Schwartz, 2008). According to Partridge (2011), research has showed risks and side effects as insomnia, the potential for addiction, mental health problem including anxiety, headache, heart problems, loss of appetite/nausea.
Research done by Smith & Farah (2011) reported that stimulants were preferably used to enhance cognitive performance. Nevertheless, other reasons like "losing weight or counteracting the effects of other drugs, were also reported." Previous research revealed also that the main motivation for the use of prescription stimulants is the search for a better academic performance once students arrive college, involving a demand for improvements on concentration and alertness (Teter, 2005).

1.2 Digital, Cosmopolitan, Internet and Health

There is a trend around digital health promotion practices, being most of the content searched mainly by people who are interested in improving their health and fitness (Lupton, 2014). According to Wartella et al. (2016), millennials are constantly online, via social networks, being no surprise that they use and rely on digital media to answer their health questions. Most of the times this free and easy access to information has provided evidence that millennials are concerned about many health issues, ranging from fitness, sexual activity, recreational drugs use, hygiene, but importantly, mental health and stress control.

1.3 Global paradigm

According to previous findings (Greely et al., 2008) today, on university campuses around the world, young adults are looking for ways to buy and sell prescription drugs, such as Adderall and Ritalin. They do this not to get high, but to get higher grades, aiming at have an edge over their friends and fellow students or to increase their academic performance. This is not a recent phenomenon: in 2004 it was documented a consumption of 2.3% Ritalin, 1.9% methamphetamine, 0.7% Dexedrine, 0.2% Benzedrine, 0.2% Methedrine, 0.1% Preludin, and 0.1% Dexamyl on a national survey on drug use in United States (Johnston et al., 2004).

A survey conducted by the Oxford University student newspaper Cherwell revealed that 15.6% of the students took Modafinil or another "smart drug" without prescription, out of a total of 662 responses. In Germany, 2569 university students from the University in Mainz were interviewed and the estimated 12-month prevalence of using cognitive-enhancing drugs was found to be 20%. Prevalence varied by sex (male 23.7%, female 17.0%), field of study (highest in sports-related studies, 25.4%), and semester (first semester 24.3%, beyond first semester 16.7%) (Dietz, 2013).

1.4 Portuguese Paradigm

In May 2015 it was reported by the DGS (National Institute of Health), that in Portugal children were consuming five million psychotropic drugs packages annually. According to the report Ritalin was the most common consumed medication. Several magazines and premium newspapers documented interviews with young students that were avid consumers of Methylphenidate during exams. An example was a testimonial of a student from University of Lisbon, where he shares that it was the best solution to help him studying fourteen hours a day (https://arquivos.rtp.pt/conteudos/estudo-sobre-o-consumo-de-droga-por-estudantes-universitarios/#sthash.MDTtjTSp.dpbs)

In Portugal, according to III National Survey on the consumption of psychoactive substances amongst the Portuguese Population from 2012, young people from 15 to 24 years old revealed a consumption of 1.0%. According to a study from Alcântara da Silva (2015), regarding the use of supplements, it was found 15.3%, comparing with 5.1% of cognitive enhancers.

Bad mood and emotional instability were reported by most Portuguese higher education students, specially anxiety and stress. This was related to the demands on University performance and, to a lesser extent, feelings of sadness and depression correlated with loneliness, with special emphasis on displaced students and with less active sociability. (Alcântara da Silva, 2015). According to Mourão (2008), it should be added that psychoactive substances, whether licit or illicit, find a preponderant role, either by meeting the desired hedonism or by responding to the stress levels installed, or by providing the surpassing of physical and psychological limits in a process of searching for a happier daily life.

The present phenomenon is more worrying if looking to the figures reported by Balsa in 2014: the evolution of consumption over the last ten years has been marked by an increase from 7.8% to 12% between 2001 and 2007. Although with fallen to 9.5% in 2012, occasional rises may be observed in the case of some indicators or some specific populations, which is a public health issue knowing the immediate risks and the unknown consequence for the future of these young adults.

The use and especially the misuse of prescription stimulants has drawn attention of the public, health professionals and policy makers (Arria, 2006) to this consumption as a public health issue. There is evidence that the non-medical use of prescription stimulants represents a problem among young adults in general and among college students in particular (Teter et al. 2003). As far as known, there is no published data about the use and misuse of cognitive enhancement drugs among the university students at a national level and, particularly, with the University of Lisbon (UL), the biggest Portuguese university and one of the biggest in the Iberia peninsula.

1.5 Study Aim and Objectives

The main purpose of this study was to identify and measure the use and misuse of psycho active substances, both those classified as food supplements as well as prescribed drugs, amongst a sample of national higher education students in Portugal. Findings from CJ Teter, 2006 reported that the beginning illicit use of prescription stimulants were more frequently by students in college. It is aimed to compare students from University of Lisbon with students from other Portuguese regions. This comparison takes into account the fact that Lisbon is the Capital which inherently includes a higher amount of students, a higher amount of internationals and also the possibility of higher pressure due to closeness with the business center of the country and an enhanced feeling of competition for entering the labour market. The focus on students is particularly relevant as several researchers have shown that the enhancement use of these prescription drugs is common and increasingly prevalent, particularly among healthy university students. (Partridge, 2011). The study objectives include the investigation on stimulant substances usage prevalence, as well as the possible correlation with field of study.

Objective: This study intends to do a descriptive studi where is examined the the use of stimulants substances, in particular prescription drugs such as Methylphenidate, Dexedrine or Adderall, amongst Portuguese college students, comprising students' and colleges characteristics.

2. Methods

This study followed an observational, cross-sectional, descriptive design. Portuguese college students received an invitation to participate on a self-administered national online survey, using national and local students' associations and unions as the main recruitment points for the study.

2.1 Sampling

The participants' sample inclusion criteria comprised being a higher education student attending a Portuguese public or private university, in undergrad or postgrad studies, holding national or foreign citizenship. Participants from non-university studies were excluded.

An initial contact with students' representative, explaining the objectives and methods allowed to establish partnership with all the student's unions of from all public and private Portuguese Universities. These organizations have comprehensive mailing lists of all registered students. Next, tailored e-messages with the survey website link, both in Portuguese and English, explaining and inviting the students to take part in the study, were sent to national and local contact persons for dissemination. Knowing all prospective participants have easy internet access, at least on the University grounds and premises, it was expected a good rate of voluntary participation.
Regarding the UL there is a population size of 47794 individuals (Sobre Nós | ULisboa, 2017). To be able to compare the UL students' results with the all other country students, a representative sample size from UL of 404 students was estimated, using a confidence level of 95% and margin of error 5%.

2.2 Survey tool

The survey was developed following the anonymous and closed questionnaire proposed by the National Anti-Drug Secretariat (SENAD) (Batista, 2010) and a study from Kaloyanides (2007), examining the use of prescription-based stimulants, its illicit use and abuse, as well as alcohol and other drugs among college students in Portugal and the United States. The content validity of the survey was supported by pharmacological and toxicological experts.
On the first part of the survey contained a screening heading with a variety of known psycho stimulants, supplements and vitamins, where the participant would self-report the use of any, by selecting all the specific stimulants that they had used before, as well as the way of acquisition and the purpose of usage. Product items included both generic and brand names, as well as applicable jargon, in order to increase response rate. The second section covered the side effects felt during the use of prescription-based stimulants, motivations and drug interactions.

2.3 Ethical considerations

It should be noted that since the beginning it was explicit that students were answering a randomized, confidential and anonymous web survey. The research was reported to the national council of data protection and the researchers were able to prove that they didn't collected any personal information from the participants. All the data was gathered in a restricted folder and kept secure to ensure confidentiality and the protection of the participants.

The present study focused exclusively on college students and examined associations between University demography, field of studies the researchers treated all the data using a comparison between these different characteristics.

2.4 Statistical analysis

Statistical analysis was carried out using IBM Statistical Package for the Social Science (SPSS) version 25. Descriptive statistics as well as tests (e.g. independent samples *t*-Student) were performed to determine any significant differences and associations concerning the use of the various substances. For instance, it was aimed to test the hypothesis that the UL students differ significantly from non-UL ones in terms of mean consumption values, using the *t*-test.

3. Results

From the total number of potential participants, it was reached 755 countrywide (17% foreign students and 83% national students). From the 47794 UL prospective participants, 406 UL students responded to the survey. The UL sample age and gender distribution showed no statistical differences with the UL student population (p>0.05).

Participants' replies to the question if they ever consumed stimulant medications, prescribed or not, with the aim of increasing their cognitive or physical performance, are presented in Table 1, divided by the 2 subsamples, i.e. from UL or not. The *Chi-square=0.465* test showed a p>0.05, meaning no significant effect on stimulant substances consumption use according to the higher education institution origin.

Table 1 - Use of stimulants UL and Non-UL Students (n=755)

Have you ever consumed stimulant medications, prescribed or not, to increase your cognitive or physical performance?

	Non University of Lisbon Students	University of Lisbon Students	Total
"No"	232	280	512 (0,68%)
"Yes"	117	126	243 (0,32%)
Total	349	406	755

Note: Within each dependent measure, means with different subscripts differ significantly (p<0,05)

Table 2 shows all participants academic background and their replies to if ever consumed stimulant medications, prescribed or not. 19.3% of the Health Sciences (HS) students referred that they did, while the sum of Humanities and Exact & Natural sciences students stays quite bellow the HS group (12,9%). According to the *Chi-square* test result (Chi^2=0.001, p<0.05) the field of study is significantly associated with being a HS student in Portugal. (Figure 1).

Table 2 - Use of stimulants according to the field of study (n=755)

Have you ever consumed stimulant medications prescribed or not, to increase your cognitive or physical performance?

		Humanities in general	Exact & natural sciences	Health sciences	Total
"No"	Score	177	93	242	512
	% of Total	23,4%	12,3%	32,1%	67,8%
"Yes"	Score	54	43	146	243
	% of Total	7,2%	5,7%	19,3%	32,2%
"Total"	Score	231	136	388	755
	% do Total	30,6%	18,0%	51,4%	100,0%

Note: Within each dependent measure, means with different subscripts differ significantly (p<0,05)

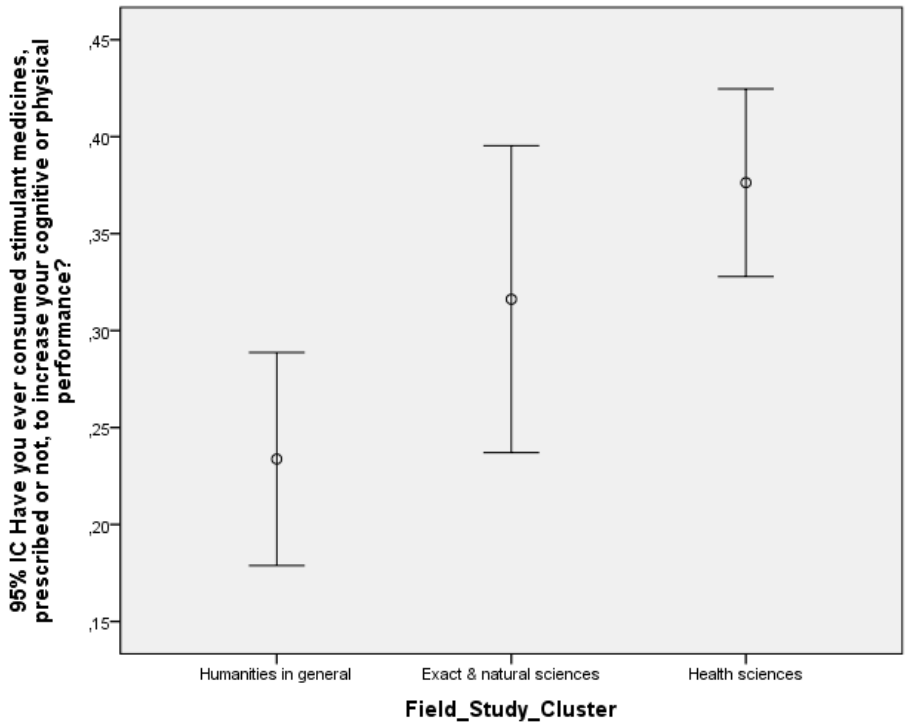

Figure 1 - Consumption of stimulant substances according to academic background

It was also aimed to measure if there was any difference between UL and non-UL students in terms of Methylphenidate (Ritalin or Rubifen) consumption (Table 3). As shown, there was a difference that suggest non-UL students tend to consume more methylphenidate than UL ones, although the *Chi-square* test showed a p=0.05.

Table 3 - Consumption of Methylphenidate according to University demography

Have you ever consumed Methylphenidate (Ritalin or Rubifen)?

	Non-University of Lisbon	University Lisbon	Total
"No"	336	400	736
"Yes"	13	6	19
Total	349	406	755

Note: Within each dependent measure, means with different subscripts differ significantly (p<0,05)

When asked about regular protein and vitamin supplements intake, non-UL tend to consume more of these legal stimulant substances than UL students (Table 4), with 12 out of 100 students consuming protein and/or vitamin supplements compared to approximately 7 out of 100 at UL. Again, there was no evidence of a statistically significant effect regarding the consumption of these stimulant substances regarding University origin (Figure 2).

Table 4 - Consumption of Protein and Vitamin Supplements according to University origin

Have you ever consumed Protein and Vitamin Supplements?			
	Non- University of Lisbon	University of Lisbon	Total
"No"	306	375	681
"Yes"	43	31	74
Total	349	406	755

Note: Within each dependent measure, means with different subscripts differ significantly (p<0,05)

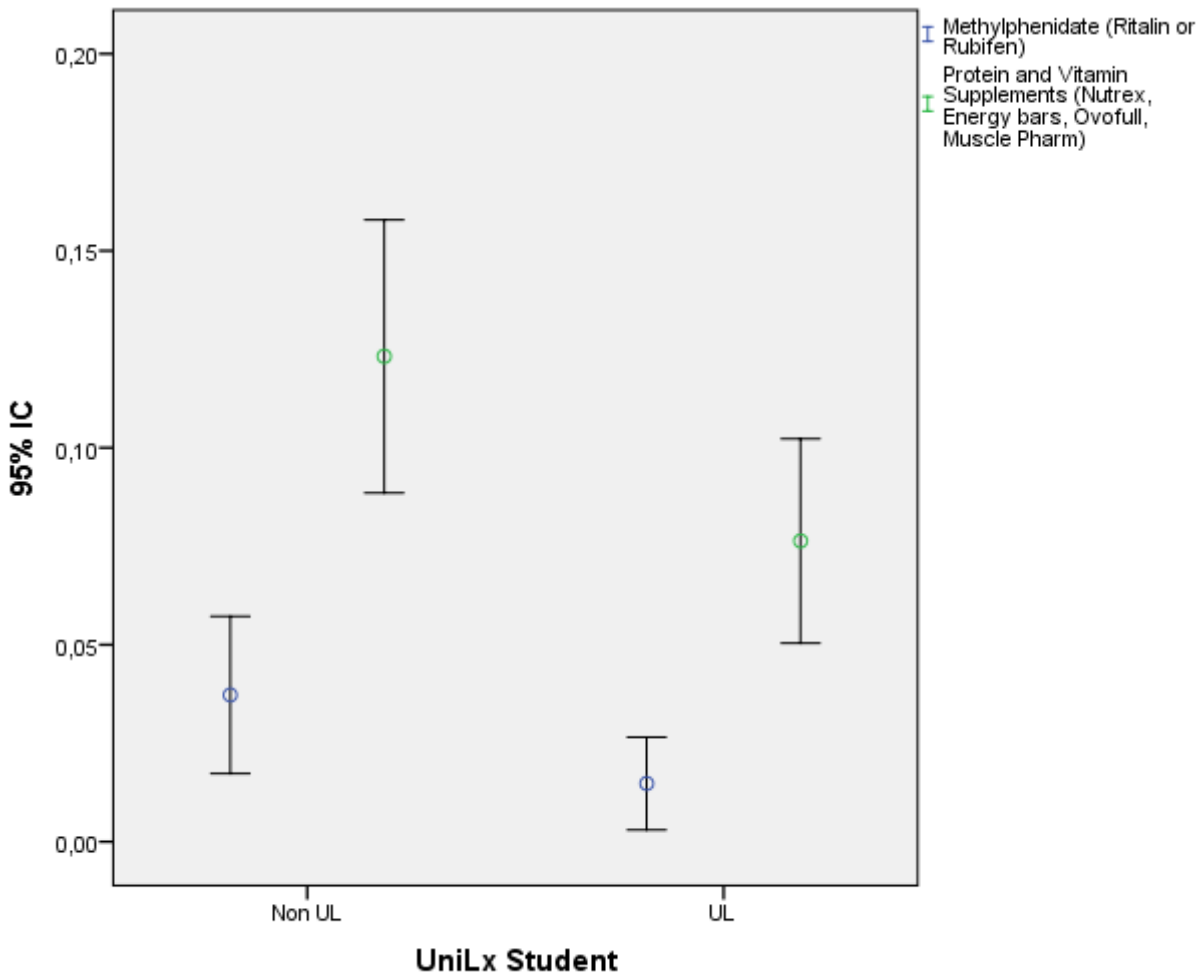

Figure 2 - Consumption of Methylphenidate and Protein and Vitamin supplements

During the data collection was found an overall higher consumption of non-specific stimulant substances. According to the figure 3 there's also a pronounced trend for a consumption of central nervous system stimulants among Humanities students in general when compared with other field of study areas. (Figure3).

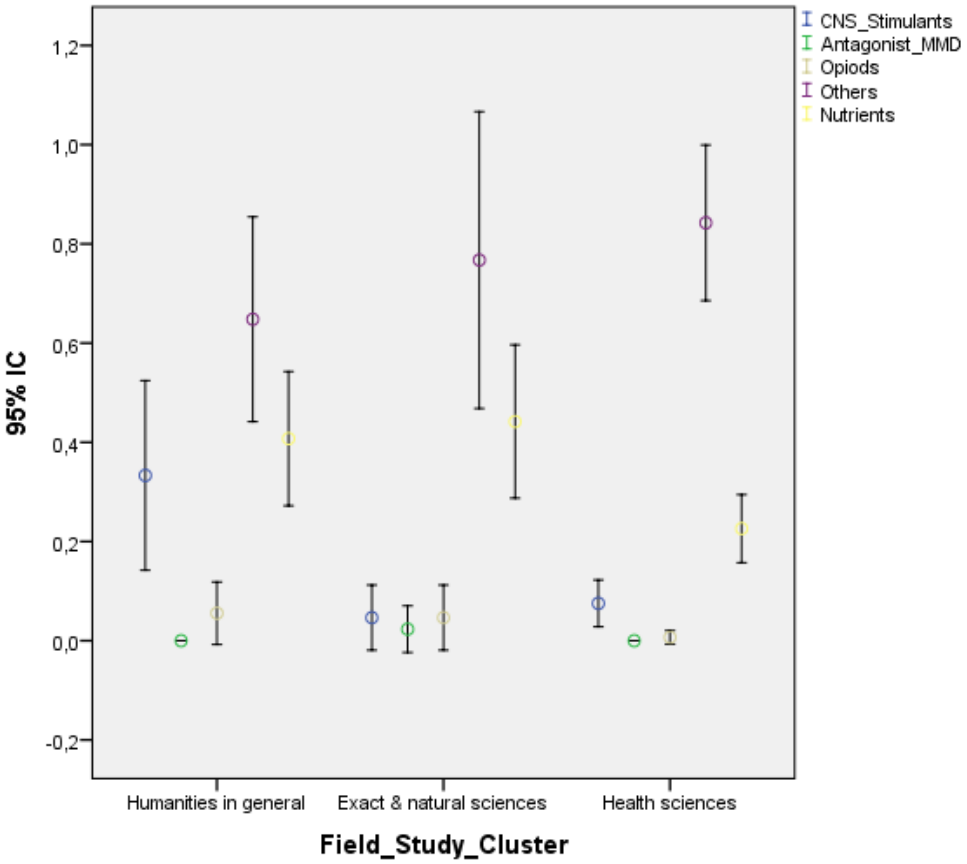

Figure 3 - Types of stimulant substances consumed according to each field of study

Substances consumption level amongst non-UL and UL students was carried out and results showed that there was no significant difference in terms of the University of Lisbon Students and non-University of Lisbon students (Figure 4).

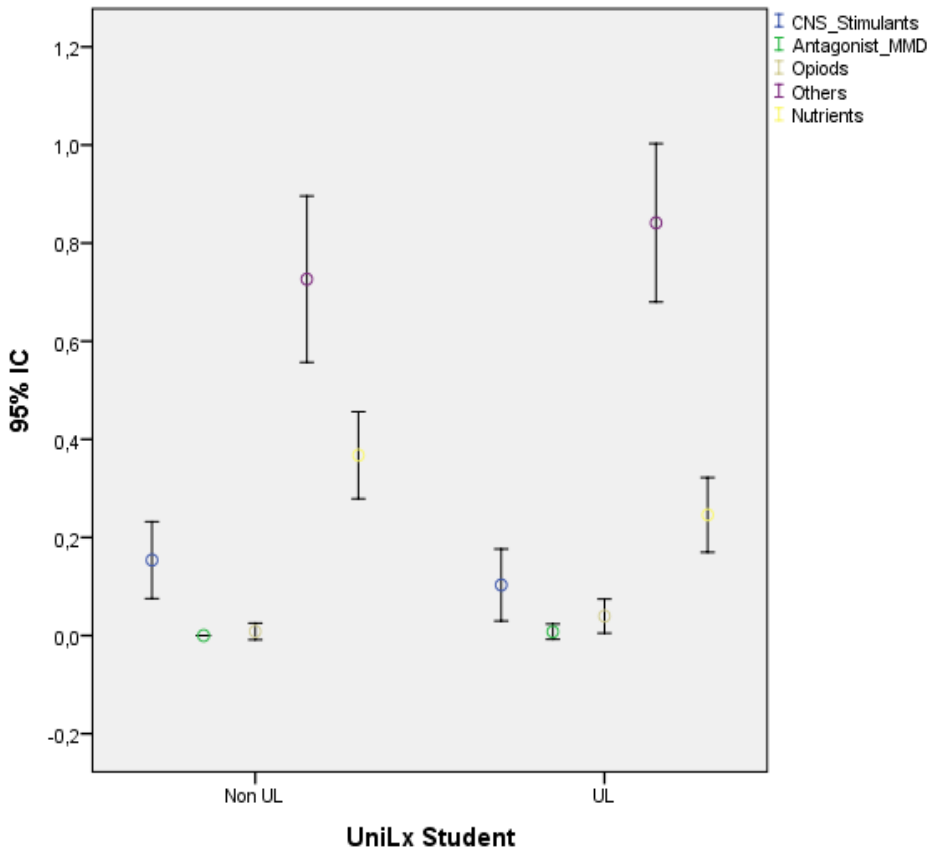

Figure 4 – Types of stimulant substances consumed according to University origin

To understand if there was any association between students' complete level of education and stimulant substances consumption, these were analyzed. There was a small trend showing that students tend to consume more stimulant substances as they progress in college and start becoming adults with more autonomy and financial independency. 28 out of 100 students said they started consuming supplements before college and 33 out of 100 students said they started during and after college (Table 5). Nevertheless, p was > 0,05 so there was no evidence of a statistically significant effect of the level of education and the consumption of stimulant substances.

Table 5 - Consumption of stimulant medicines according to the highest level of education completed

Have you ever consumed stimulant medicines, prescribed or not, to increase your cognitive or physical performance?

		The highest level of education you have completed									
		1st year bachel.	1st year master	2nd year bachel.	2nd year master	3rd year bachel.	High School	PhD	Postgraduate (e.g. MBA)	4th year bachel.	Total
no	Score	56	89	75	70	122	72	9	17	2	512
	% of Total	7,3%	11,8%	9,9%	9,3%	16,2%	9,5%	1,2%	2,3%	0,3%	67,8%
yes	Score	36	39	25	49	56	28	5	3	2	243
	% of Total	4,8%	5,2%	3,3%	6,5%	7,4%	3,7%	0,7%	0,4%	0,3%	32,2%
total	Score	91	128	100	119	178	100	14	20	4	755
	% do Total	12,2%	17,0%	13,2%	15,8%	23,6%	13,2%	1,9%	2,6%	0,5%	100,0%

Note: Within each dependent measure, means with different subscripts differ significantly (p<0,05)

Participants were asked about the channels that they used to acquire stimulant substances and generally speaking the top channel was the pharmacy and specially “recommendation by a pharmacist”. There was a pronounced trend on the online acquisition where was shown that students from Exact & Natural sciences tend to acquire stimulant substances online (Figure 5). Findings also showed that online acquisition is higher when the young student has financial income, verified by using fisher's exact test (p=0,029).

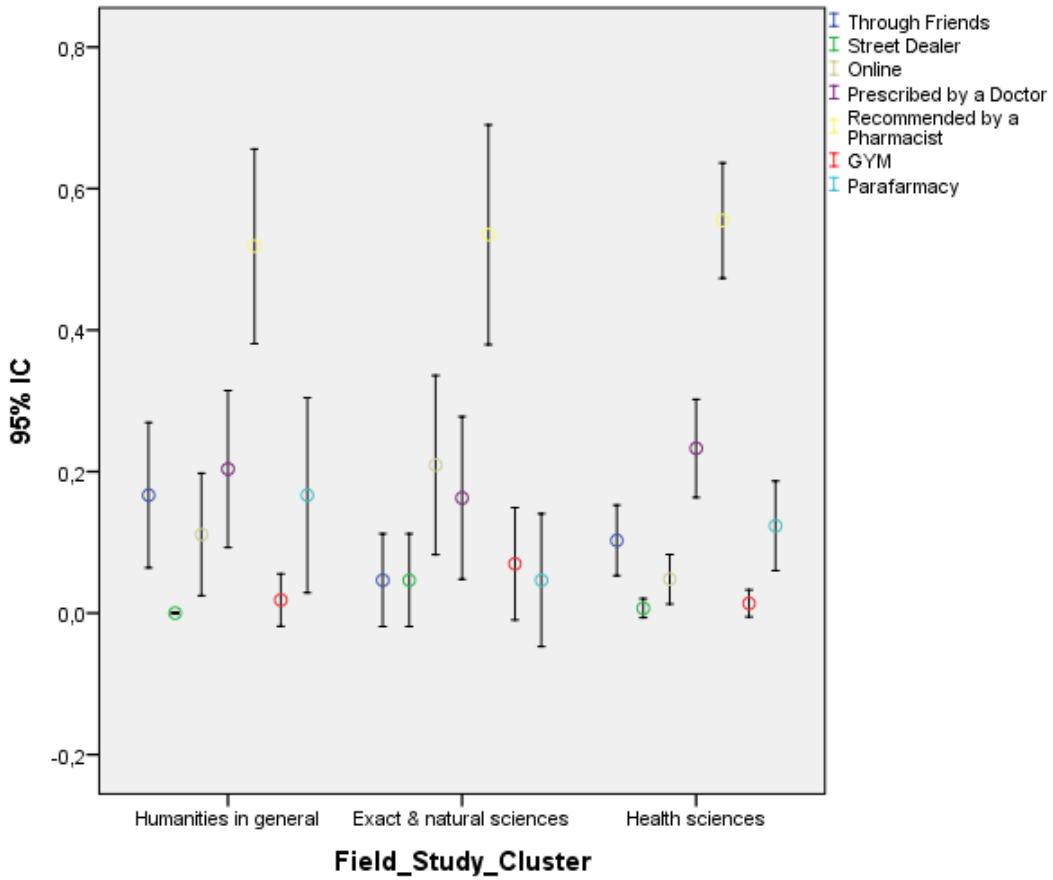

Figure 5 – Channels to acquire stimulant substances by field of study

Regarding prescriptions by a Doctor the Health Sciences students seem to be above the average (Table 6).

Table 6 - Used of stimulants prescribed by a doctor according to the field of study

Stimulant Substance prescribed by a Doctor				
	Humanities in general	Exact & natural sciences	Health sciences	Total
"No"	43	36	112	191
"Yes"	11	7	34	52
Total "Yes"	20%	16%	23%	21%

When participants were asked about the principal motives to consume stimulant substances there was a notorious trend for being related with academic performance, specially concentration and focus to improve the study outputs. As an example, 64 health students out 100 refer they use these types of drugs to help them concentrate (Table 7).

Table 7 - Motives for consuming stimulant substances according to the field of study

Motivation for consuming stimulant substances

			Humanities in general	Exact & natural sciences	Health sciences	Total
It helps me concentrate	**"No"**	Score	24	19	52	95
		% of Total	9,9%	7,8%	21,4%	39,1%
	"Yes"	Score	30	24	94	148
		% of Total	12,3%	9,9%	38,7%	60,9%
It helps increase my alertness	**"No"**	Score	40	30	88	158
		% of Total	16,5%	12,3%	36,2%	65,0%
	"Yes"	Score	14	13	58	85
		% of Total	5,8%	5,3%	23,9%	35,0%
Because it helps me study	**"No"**	Score	34	25	76	135
		% of Total	14,0%	10,3%	31,3%	55,6%
	"Yes"	Score	20	18	70	108
		% of Total	8,2%	7,4%	28,8%	44,4%

4. Discussion

This study aimed to assess the consumption of substances believed to provide intellectual and physical advantages regarding a demanding higher education context. One of the main findings is that 67 students out of 100 assumed the consumption of stimulant medicines, prescribed or not, to increase their cognitive or physical performance. Results showed that 7% of the participants used Methylphenidate (Ritalin) to improve their intellectual performance. Nevertheless, when it comes to the use of overall "smart drugs" Portuguese students follow the global average. Previous studies mentioned Ritalin as one of the most commonly used drug in this context (Hall, 2015)

Follows below the main findings stated before:

One the of most important factors that we should take into account is the channels that students are using to acquire stimulant substances. Since the online search is growing on the University campus, Universities and health systems should understand and take concrete actions in terms of tracking and control. As an example a study from IBSA Foundation from 2015 in Italy proved that 1 in 2 Italians (2 out of 3 in the 25-55 age group) look online for health information and when it comes to people with a university degree turn to multiple sources including the GP (79%) and the web (73%). Interestingly, on the present study this was one the less used channels to acquire supplements. According to our research, alternatively, pharmacies were the top channel. By comparing directly with parapharmacies we concluded that Pharmacies tend to be the key channel to buy even the non prescribed substances as supplements and other stimulant drugs for intellectual and physical enhancement. These findings also proves that young people still trust on the pharmaceutical professionals. Nevertheless it's important to note that findings from this study proves that there are was no evidence of a statistically significant effect of access to the internet related to drugs usage.

Findings also suggest that students from University of Lisbon tend to buy drugs and supplements through online when compared with other students in Portugal. Due to the cosmopolitan and growth online purchase behavior.

Another important characteristic is related with the prevalence for cognitive-enhancing drug use according to the number of years spent at the university (CJ Teter, 2006). As students advance in the years of Study on the University the subjects tend to become more demanding and we questioned that this would be sufficient for students to start looking for "smart drugs" for better memory, more clarity and focus and enhanced problem-solving abilities. Interestingly, findings suggest that there was no evidence of a statistically significant effect regarding the number of years spent at the university with the prevalence of drugs use.

Findings show a statistical association between the field of study and drugs usage. When compared, Health Sciences students showed to be the biggest consumers followed by students from Exact and Natural Sciences. When asked about motivations for the drugs usage students referred improve their academic performance expecting the result of better memory, more clarity and focus as the top reason. It is likely that Health Sciences subjects demands high levels of study hours and focus (Åkerstedt, 2002), which appear to increase the need of cognitive enhancers. Interestingly, when it comes to general supplements versus smart drugs, present data shows that students from Humanities consume more CNS stimulants like Ritalin (methylphenidate), Adderall and Modafinil, statistically different from Health Sciences students. This behavior suggests that students from humanities in general tend to search for hardcore substances as a predisposition for new experiences and high levels of creativity. While students from Health Sciences prove to be more aware about the side effects of "smart drugs". Further research should be conducted to determine a behavioral line and motivations related with field of study.

When it comes to use of stimulant drugs by comparing Students who have been studying at University of Lisbon and non-University of Lisbon students findings suggest that there was no evidence of a statistically significant effect but there was some evidence that studying at University of Lisbon may promote drugs usage. University of Lisbon is known as one the biggest from Iberia (Portugal and Spain). Year over year University of Lisbon is receiving more Erasmus students and being considered one of the most entrepreneurial, innovator and cosmopolitan city in Europe (Neirotti, 2014). This atmosphere promotes and gives student information and space to search for new ways to improve their performance and get competitive advantage over their fellow colleagues (Collin, 2012).

These results are potentially justified by the life changes that are taking place at the student's personal level. The moment of entering into higher education is often related with self-empowerment which allows young people to get a broader scope of action, with the autonomy to manage their own lives, daily practices, body, health and social network (DM Fetterman, 2001). Moreover, nowadays it is well-known that young adults in Portugal face an increasing insecurity and uncertainty about their transitions to the world of work and adulthood (Becker, 2010). These factors can create the perfect context for a bigger search and research for options

that increase the feeling of being in control and of self-confidence to overcome adversities. It is true that the described attitudes can enhance the willingness to adopt certain "risk behaviors", which may lead to the use of cognitive enhancement drugs to improve their academic performance. As referred, this type of prescribed drugs are clinically safe and effective for their therapeutic indications but not for this “off label” consumptions leading young adults to unhealthy and unwanted side-effects.

5. Limitations

The main study limitations comprise the underreporting that can occur using online surveys, knowing any possible breaches in data confidentiality disclosing socially sensitive issues such as the use of doping substances. The other associated main limitation comprises participants’ self-selection bias, more difficult to control when the overall population size is not completely known as a result of a complete randomized response technique. Nevertheless, web-based surveys have been extensively used, revealing higher prevalence rates for socially sensitive issues compared with the rates using direct questionnaires (Greenberg BG, 1969).

Other limitation is the up-dating of mailing-lists, e.g. researchers’ lack of control on non-official email address from students entering the higher education community or those in lists but actually no longer at the university. To avoid this, it was clearly explained on the email body the context and purpose of this research.

An additional limitation in results interpretation may exist from the lack of construct and reliability validation of the survey tool.

6. Conclusions

Overall, this study accounts for the growing number of students turning to “smart drugs” to improve their academic performance. Although no statistical representation was assured, the overall consumption cannot be framed as an emerging public health issue, following what is described for other Western countries. Nevertheless, to control for potential inequalities in academic rankings and success, as well as concerning ill-health implications in the long run, it is recommended that Portuguese universities to consider measures such as information and education campaigns, up to random screening. Further research should involve the universities social and medical services, as well as other members from the higher education ecosystems to give effective responses to ensure that students avoid the use and misuse of supplements and cognitive enhancement drugs.

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